

ABORIGINAL SITES ON MILLSTREAM STATION, PILBARA, WESTERN AUSTRALIA

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[Received 10 June 1977. Accepted 14 July 1977. Published 30 June 1978.]

ABSTRACT

Part of the Fortescue valley on Millstream station, Pilbara, Western Australia is under consideration for reservoir construction. The proposed reservoir would inundate a number of Aboriginal sites; to meet this contingency Western Australian Museum staff carried out a site survey. Significant features of valley geomorphology, site topography and stone artifact assemblages are described, and various painting and engraving sites are noted. Aboriginal narratives describing mythological and ritual aspects of various localities in the valley are recorded.

INTRODUCTION

(J.C., W.C.D. and C.E.D.)

In Western Australia all Aboriginal sites are protected by the Aboriginal Heritage Act (1972); and the Registrar of Aboriginal Sites, Western Australian Museum, has had since 1970 the responsibility of recording sites in threatened areas.

On several recent occasions staff of the Aboriginal Sites Department and other Museum staff have co-operated in the assessment and salvage of Aboriginal sites which were threatened or due to be destroyed. A notable example of these activities is the Ord valley salvage project where a number of significant archaeological sites were recorded and excavated before they became permanently inundated by the waters of Lake Argyle (Dortch 1977).

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A potentially similar situation exists in part of the Fortescue valley, Millstream pastoral station, Pilbara (Fig. 1), where a water storage reservoir under consideration would, if constructed, result in the inundation of a number of Aboriginal sites. Because of this the former Registrar of Aboriginal Sites organised a site survey¹ aimed at assessing and recording sites in the proposed reservoir area, that is, that part of the Fortescue valley extending from Gregory Gorge upstream as far as Millstream station homestead (Fig. 2).

The site survey was conducted at two levels: a brief general search for archaeological sites; and a more time-consuming programme of enquiries among Aborigines with knowledge of local sites. Neither aspect of the survey is complete. The pattern of site distribution emerging from the archaeological study is certain to be modified by further, more intensive field research; and the ethnographic enquiries so far have obtained data of particular significance to local Aborigines, and not necessarily of ecological or archaeological importance.

Physical Environment

Millstream pastoral station contains the largest series of permanent pools in the Fortescue valley. The pools are widely known for their scenic attractions, and they form a virtual oasis in the generally arid region flanked to the south by the Hamersley Range and to the north by low hills known as the Tableland (Fig. 1; Kriewaldtord and Ryan 1967).

The Fortescue River flows only after heavy rain, which is seldom and irregular. It has a straight narrow drainage basin, and has cut a long deep canyon through volcanic rocks from Gregory Gorge downstream to its flood plain near the mouth. Upstream from the gorge the river does not increase appreciably in elevation, but below the gorge the valley is an active torrent bed. The river was well established in the Tertiary, when it had a wide flat valley with thick alluvial deposits, and probably flowed west to join the existing Robe River system. During Quaternary times uplift of the Pilbara block rejuvenated streams flowing off the Tableland. The active headward erosion cutting back into the relatively soft Proterozoic rocks tended to

1. The Millstream survey party included the following Western Australian Museum staff.

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result in capture of westward flowing streams (Kriewaldtord and Ryan 1967); the present Fortescue River downstream from the permanent pools is probably the result of such capture. Here the river enters a narrow gorge and is actively eroding its bed; its gradient is higher and tributary streams have been rejuvenated. This active erosional environment in which successive floods remove older sediments results in archaeological deposits which are generally superficial and of relatively very recent origin (Plate 1; Fig. 3a).

Upstream from Gregory Gorge the river flows through its original, flat alluviated valley. In this superficially dry reach there is an extensive aquifer currently exploited for fresh water by pumping from a series of bores directly to the consumer townships serving the iron ore industry. Here the old valley deposits, ranging in age back to the Tertiary, are still preserved, and are being slowly cut back by the river. (These deposits are referred to here as the 'Fortescue valley surface': Plates 1 and 2; Fig. 3b.)

Pools (Plates 3 and 4) occur where the river has cut down through permeable alluvium and these permanent features are maintained by waters of the aquifer. The alluvium of the main channel undergoes repeated erosion, resulting in the re-sorting of contained archaeological material. Archaeological assemblages on the Fortescue valley surface and on the surfaces of mature alluvial terraces on tributary streams (notably Millstream) away from the heavily eroded main channel are apparently not eroded, though some of these have been severely disturbed by European development.

The Aboriginal Sites

Sites fall into two categories: those of immediate concern to Aborigines, and those which are identifiable by archaeological evidence. The latter category consists of surface scatters of stone artifacts, considered here in some detail, as well as several art sites described below.

Aboriginal interest in the area focuses on the total valley (some 110 km in length) and particularly on the gorges and pools. From an Aboriginal viewpoint it is unsatisfactory to discuss individual sites in isolation since the river constitutes a unity over and through which the Dreamtime ancestors travelled, and their function as creators, instigators and founders of traditional belief is inextricable from the natural features that are seen to proclaim their validity. Nevertheless it is necessary to describe specific sites for the purpose of the survey.

The area was homeland for *Indjibundi* speaking people (cf. Tindale 1974). Von Brandenstein (1967) reported that less than 1,000 people spoke the

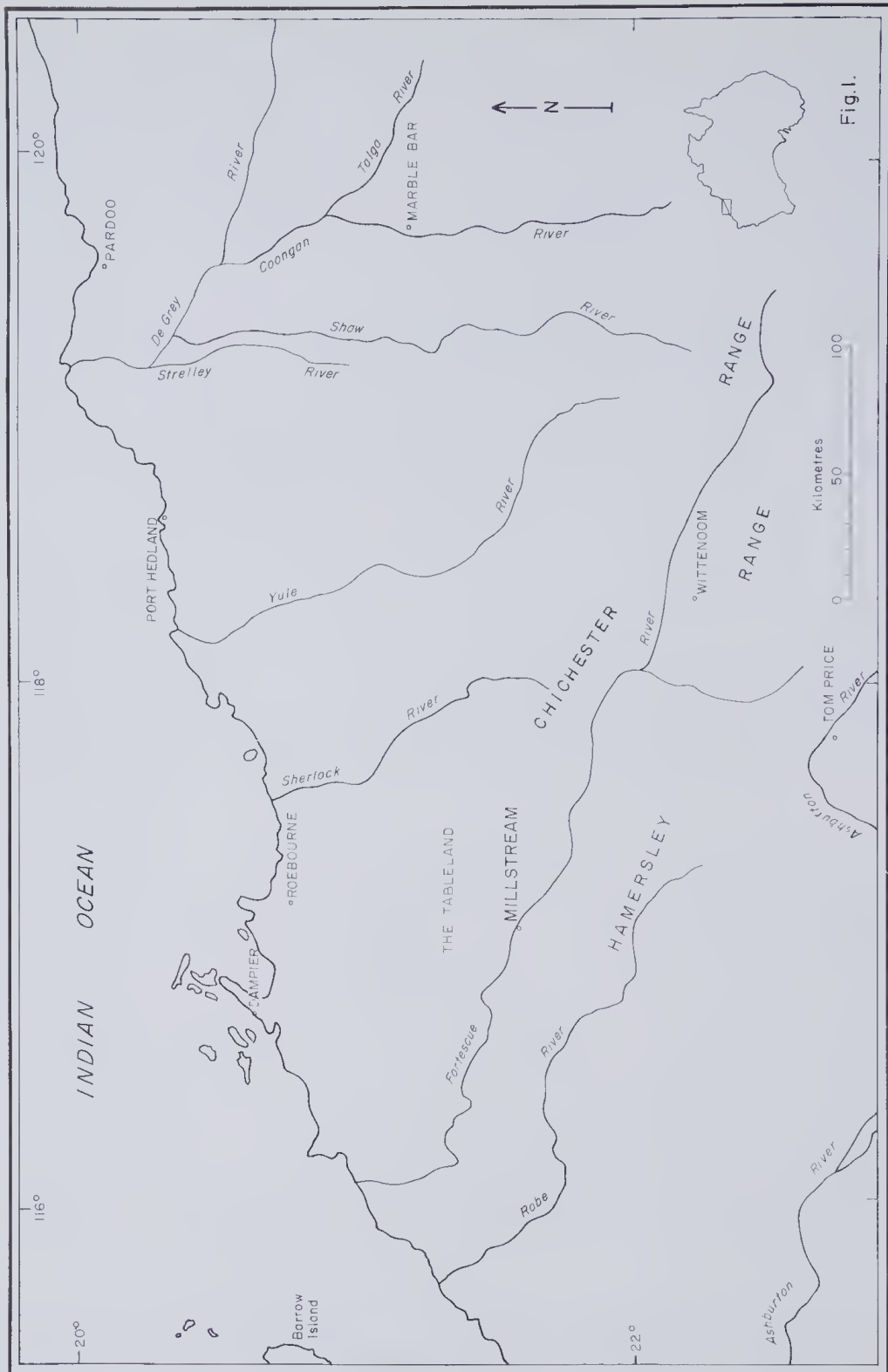


Fig. 1.

Fig. 1 : Area map showing localities mentioned in the text.

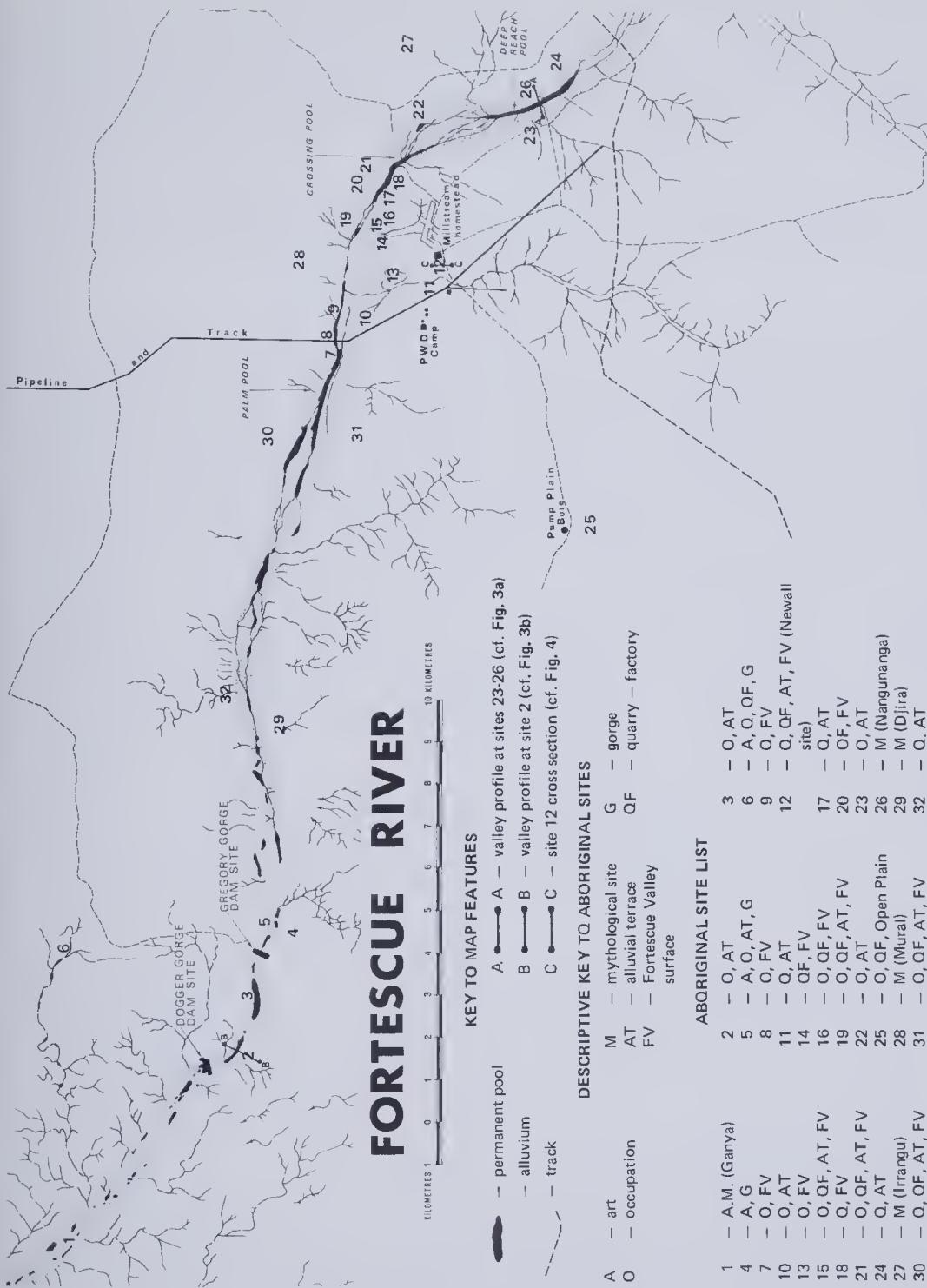


Fig. 2: Map showing numbered Aboriginal sites on Millstream station.

KEY TO MAP FEATURES

- permanent pool
- alluvium
- track

- A — valley profile at sites 23-26 (cf. Fig. 3a)
- B — valley profile at site 2 (cf. Fig. 3b)
- C — site 12 cross section (cf. Fig. 4)

DESCRIPTIVE KEY TO ABORIGINAL SITES

- A — art
- O — occupation
- M — mythological site
- AT — alluvial terrace
- FV — Fortescue Valley surface
- G — gorge
- QF — quarry — factory

ABORIGINAL SITE LIST

1	— A.M. (Ganya)	2	— O, AT	3	— O, AT
4	— A, G	5	— A, O, AT, G	6	— A, O, QF, G
7	— O, FV	8	— O, FV	9	— O, FV
10	— O, AT	11	— O, AT	12	— O, QF, AT, FV (Newall site)
13	— O, FV	14	— QF, FV	17	— O, AT
15	— O, QF, AT, FV	16	— O, QF, FV	20	— OF, FV
18	— O, FV	19	— O, QF, AT, FV	23	— O, AT
21	— O, QF, AT, FV	22	— O, AT	26	— M (Nangunanga)
24	— O, AT	25	— O, QF, Open Plain	29	— M (Djira)
27	— M (Irrangu)	28	— M (Mural)	32	— O, AT
30	— O, QF, AT, FV				

language in the mid-1960s; even so the language is one of the two best-known in the Pilbara (the other being the *Nyangamade* language, east of De Grey river. These people today are dispersed throughout the Pilbara, particularly at Roebourne, Onslow and Wittenoom (Fig. 1). In addition to *Indjibundi* people, *Bandjima* and *Kurima* speakers contributed information on the mythology and associated ritual of the area, described below.

Numbered Aboriginal site locations recorded in the Millstream survey are shown in Fig. 2. Where mentioned in the text these site numbers are given in brackets, for example (14).

The Newall Collection

Millstream station is of particular interest to Australian archaeologists because of the Newall site (12; Fig. 2) at Millstream homestead. The site is well-known because it was the only archaeological site in Western Australia about which information was published during the first half of this century. In 1912 Mr R.S. Newall collected perhaps 200 retouched stone tools from a confined area (12; Fig. 2) near the pools from which the station homestead drew fresh water, and within the same year he lectured on his finds to the Prehistoric Society of East Anglia at Norwich, England (Newall 1914). Almost half his collection consists of varieties of microlithic backed pieces (i.e. geometric microliths, backed points and backed bladelets, cf. McCarthy 1967) and his account is among the earliest attempts to describe this stone tool category in the Indo-Pacific area. A few years before, the Sarasin brothers (1905) had illustrated geometric microliths from Sulawesi, but did not seem to have comprehended their typological distinction; and Etheridge and Whitelegge (1907) had described 'surgical knives' (microlithic backed points) from New South Wales which they compared with Indian backed blades.

Newall illustrated both geometric and asymmetric microliths, noting (1914, pp. 304-5) that many could be classified either as triangular or semi-circular. In the same year, Kenyon and Mahoney (1914, pp. 6, 12) referred to 'pygmy' tools in Victoria, but claimed that their size was simply a function of the scarcity of stone. As Newall envisaged cultural determinants, he may be linked with Etheridge and Whitelegge as the first to attempt a description of Australian backed blade assemblages.

No further Western Australian microlithic tools were described until another English visitor referred to them in 1943 (Noone 1943). Even in his initial survey of Australian prehistory Mulvaney (1961; p. 80) noted that the Millstream specimens were the only substantial evidence for microlithic

backed tools within the entire State; and when Glover (1967) published his definitive typological study of Newall's material, comparative material still remained meagre. More recently the collection has been important in other discussions of microlithic stone tool origins and distribution (e.g. Pearce 1973) though more recent finds and some dated material have altered the picture somewhat (Dortch 1977; Dortch and Gardner 1976; Mulvaney 1975).

OCCUPATION SITES AND STONE QUARRY-FACTORIES

(J.C., W.C.D. and C.E.D.)

The term 'occupation site' here refers to any concentration of stone tools and other artifacts in primary position, or nearly so, in a locality which by reason of its physical features would probably have made a suitable camping place for groups of hunter-gatherers. Millstream occupation sites are typically located on the alluvial terraces along the river and its tributaries, and on the weathered bedrock and colluvium of the Fortescue valley surface (Fig. 3b). These sites are all within a few hundred metres of abundant fresh water and shade. Some (e.g. the Newall site, 12) cover hundreds of square metres, others only a few square metres. The artifact evidence for occupation consists of scatters of flaked stone artifacts (tools, flakes, chips, cores and fragments) with occasional grindstones, anvil stones and baler shells (*Melo* sp.), the last probably the remains of containers. A few sites (e.g. the Newall site, 12) also contain chipped glass and other Aboriginal artifacts made of European material.

We did not use systematic sampling techniques in our collecting from the Millstream sites because most of the sites we examined are actively eroding and some have been extensively disturbed by European occupation.

For convenience the occupation and quarry-factory sites on Millstream station are divided between those along the river and its tributaries (sites 2, 3, 5, 7-24, 31 and 32) and sites 6 and 25 which are well away from the river. At the former sites silicified shale and to a lesser extent secondary silica rocks were the chief raw materials for stone working. Some quarrying of river gravels took place as there are flaked river pebbles at a number of sites.

It is difficult to make a fine distinction between occupation sites and quarry-factories. In some cases (e.g. site 16) the presence of retouched tools, including much-used pieces (e.g. adze slugs), with quarry debris, shows that people were living on the outcrops (silicified shale in this case) of stone they quarried. Other sites are predominantly quarry-factories. One of these is site 14 where there are thousands of cores, flakes, chips and fragments (but very

few retouched tools) lying on a prominent outcrop of silicified shale exposed above the Fortescue flood plain (Plate 2). However, even at this site occupation of the adjacent alluvial terrace cannot be discounted as much of the archaeological material probably has been stripped away by erosion, or buried by alluviation.

All the occupation sites are within 200 m of reliable water sources and lie on land which is topographically suitable for use by people as a campsite: usually a flat area with some degree of shade and shelter from prevailing winds. Sites shown in Fig. 2 are distinguished as to whether they lie on alluvium (AT) or on bedrock (FV — Fortescue valley surface). No dominant trend of occupation on either topographical situation seems evident. However the alluvial terraces certainly offer better camping places than the rocky slopes and it is possible that the latter sites were used largely during floods. The wide range of flaked stone artifacts, including many adze slugs, cores, fine chippings and different kinds of flaked tools, as well as anvils, grindstones, and fragments of baler shells show that the occupation sites were used by groups engaged in normal daily craft and domestic activities.

Several of the more important sites or site complexes are briefly described in the following:

The Newall Site (12)

The Newall site is a dense scatter of stone artifacts and other material located on Millstream Creek, a spring-fed tributary of the Fortescue River; the site is 200 m west of Millstream homestead and on the south side of Chinderwariner Pool (Plate 3; Fig. 4). The site has been extensively disturbed in recent years: much of the original surface has been levelled by a grader, and part of the site has been built over by homestead outbuildings. It is very difficult now to judge the extent of the site, but it is likely that before European disturbance it covered the length of the series of pools which characterise this part of Millstream.

The site is on a low alluvial fan flanked by calcrete outcrops to the south-east and extending 200 m westward to the permanent pools in the calcrete along Millstream Creek (Fig. 4). The fan grades from calcrete colluvium at the top to a red brown calcareous sandy alluvial soil with high organic content. The vegetation consists of paperbarks and palm trees on the alluvium flanking the pools and acacia scrub on the slope merging to spinifex towards the crest. The bulk of the artifact scatter lies halfway between the calcrete outcrops and the pools. Secondary silica rocks were quarried from the calcrete, and artifacts of this stone are numerous at the site.

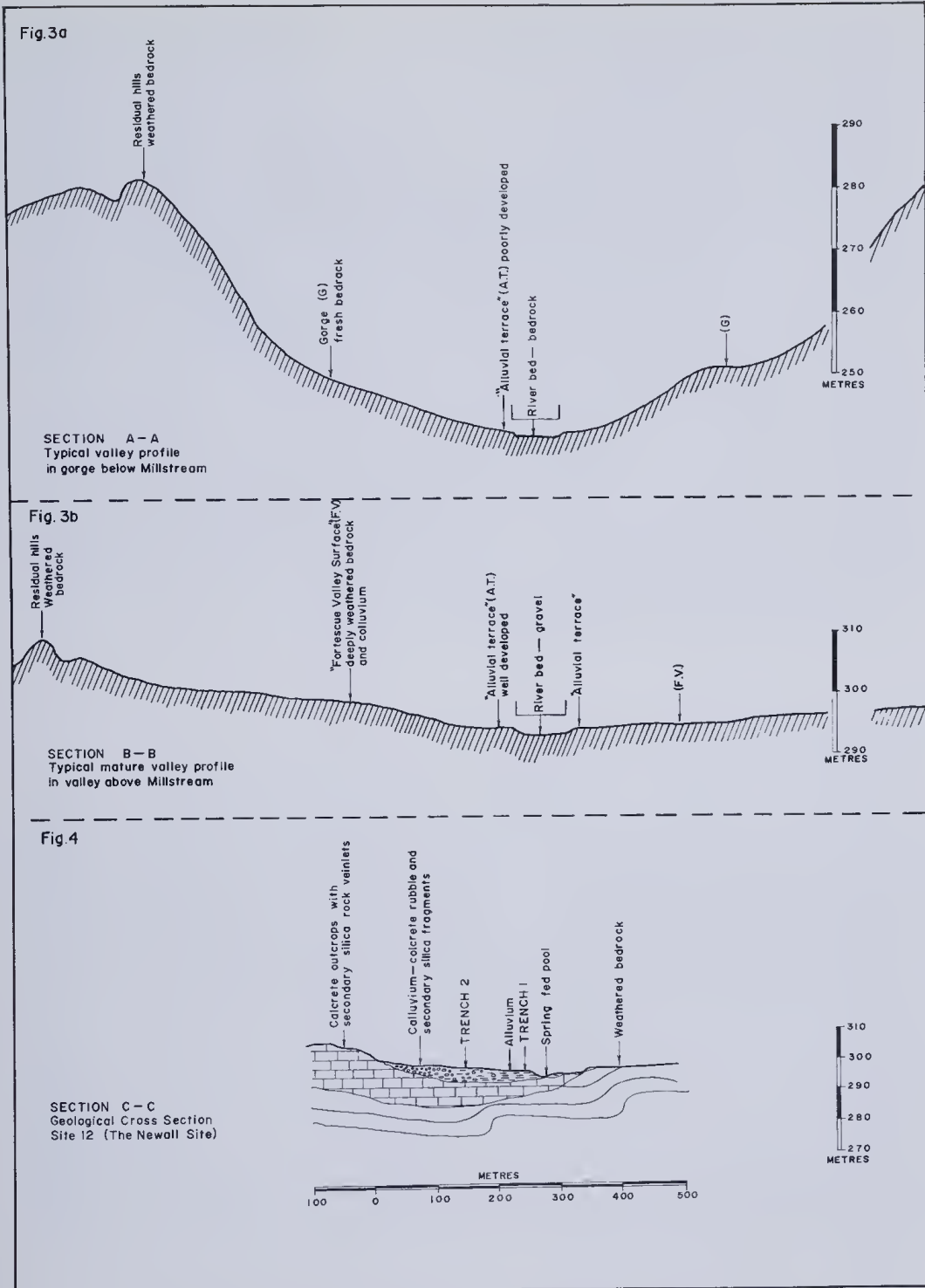


Fig. 3: Typical Fortescue valley profiles, Millstream station.
Fig. 4: Geological cross-section of the Newall site (12).



Plate 1: Gregory Gorge, looking downstream from sites 4, 5 (cf. Fig. 3a).

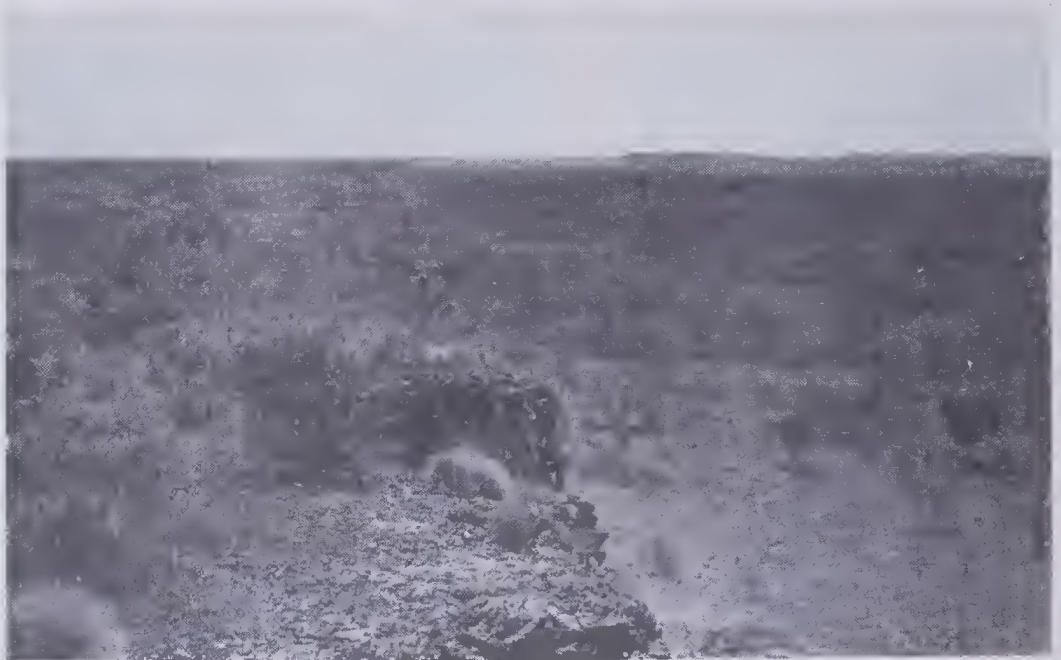


Plate 2: Fortescue valley at site 14, 15 km upstream from Gregory Gorge, showing mature valley profile. Foreground and middle distance show Fortescue valley surface (cf. Fig. 3b), and the wooded area beyond is flood plain alluvium. Horizon shows southern edge of the Tableland.



Plate 3: Chinderwariner Pool, near the Newall site, showing lush vegetation including paperbarks, palms and water lilies.



Plate 4: Crossing Pool at site 18, showing wooded surface of flood plain on north bank and exposed bedrock of Fortescue valley surface in cliff faces on each side of the flood plain.

We carried out two test pit excavations at the Newall site (Fig. 4). Each pit measured 50 x 50 cm, and was dug to a depth of about 50 cm. The first (Trench 1) was located on the alluvium 70 m southeast of Chinderwariner Pool, and contained stone artifacts only in its upper 10 cm. We dug the second test pit (Trench 2) in the lower part of the alluvial fan in a zone grading between colluvium and alluvium (Fig. 4). The tabulation below lists all the archaeological material which we recovered from Trench 2.

Trench 2, Newall site, 12

Depth below surface	Silicified shale	Secondary silica	Quartz
Surface to 3 cm	2 flakes	1 blade 1 bladelet 17 flakes 3 cores	—
3-10 cm	1 notched flake 3 flakes	9 flakes 1 land snail shell (<i>Rhagada</i> sp.*)	1 fragment
10-20 cm	4 flakes 2 fragments	1 notched flake 13 flakes	1 flake
20-30 cm	—	— 2 land snail shells as above	—
30-40 cm	3 flakes	1 flake Several fragments of land snail shell as above	
40-50 cm	1 flake		

* Pers. comm. H. Merrifield

Despite the extensive modern disturbance noted above we were able to collect several hundred stone artifacts from the surface of the Newall site. The apparent scarcity of artifacts within the alluvium and the absence of rolled artifacts at the site suggests that the artifact concentration at or very near the present surface did not accumulate through the erosion of separate assemblages of successive occupation surfaces. Instead this distribution seems to show that extensive occupation took place only when the pool was established in its present position and aggradation of the alluvium had become negligible (Fig. 4). We conclude then that the surface assemblage is simply occupation debris accumulated on the stable surface of a mature alluvial deposit.

We have not attempted to make an inventory of our surface collection, though it should be compared quantitatively with Glover's published Newall

collection (Glover 1967), and with another unpublished part of Newall's collection which has recently come to light but is not yet available for study.

The Crossing Pool Series (15-18)

Crossing Pool is one of the series of large, deep pools (Plate 4; Fig. 2) formed in the bed of the Fortescue River. The alluvium around the pool supports gallery forest consisting of paperbarks, eucalypts and palms. The surrounding weathered bedrock of the Fortescue valley surface is covered in sparse scrub. We identified a number of archaeological sites around the pool and made extensive collections at sites 15 and 16. The geomorphological setting at sites 15 and 16 is similar to that of the Newall site. Site 16 is a scatter of stone artifacts on a formation of weathered silicified shale which forms a small hill above the Fortescue flood plain. The river has cut a cliff face on the north side of the hill; to the northwest there is a scree-covered slope which is cut by a small tributary valley entering the flood plain. Artifacts are scattered over the scree-covered slope and on the sandy alluvium of the tributary valley. The artifact scatter on the slope is part of site 15.

We dug a 50 x 50 cm test pit (Trench 1) into the alluvium at site 15, the deposit being much the same as the alluvium at the Newall site. Finds from this excavation are tabulated as follows:

Trench 1, Crossing Pool, 15

Depth below surface	Silicified shale	Secondary silica	Quartz
Surface to 10 cm	2 bladelets 5 flakes 1 core	—	2 flakes 1 fragment
		1 freshwater snail shell (<i>Stenomelania cf. denisoniensis*</i>)	
10-20 cm	7 flakes 1 fragment	—	1 bladelet 2 flakes 2 fragments
20-30 cm	2 flakes 3 fragments	—	—
30-40 cm	3 flakes 4 fragments	—	—
		1 land snail shell fragment (<i>Rhagada sp.*</i>)	
40-50 cm	1 flake 1 split pebble 5 fragments	1 flake	—

* Pers. comm. H. Merrifield



Plate 5: 'Driller's Hole', site 6. The photograph is taken from the main quarry-factory area: in the lower right corner there is a semi-permanent pool below the head of the gorge; the two figures in the middle distance are standing by engraved boulders; in the background is spinifex grassland with sparse eucalypts typical of the Tableland.

Site 14

We have previously described this site (Plate 2) as a quarry-factory. It lies 500 m west of sites 15 and 16 and 1,500 m north of the Newall site. Site 14 is a shale prominence, the slopes of which are covered with quarrying debris. The site is the probable source of the yellow silicified shale which was commonly made into tools at the Crossing Pool sites and the Newall site.

Pump Plain Bore, 25

This is a site located on the edge of a large, non-permanent swamp developed on a calcrete surface deposit in the open plain 6.5 km south of the Fortescue River. The site is basically a quarry-factory where outcropping chalcedony was quarried. Pump Plain Bore is the only such chalcedony quarry-factory yet recorded in the area.

Site complexes 30 and 31

These consist of a series of surface scatters of stone artifacts on the scree slopes and alluvial fans which flank the low hills on both sides of the Fortescue valley. Most of the artifacts consist of silicified shale and secondary silica rock quarried from outcrops exposed in the hillslopes of the valley. There are very few artifacts on the surface of the alluvium, though it is probable that prehistoric camps were often located here and the resulting scatters of stone artifacts have been buried or swept away by erosion.

'Driller's Hole', 6

'Driller's Hole' is at the nickpoint of an incised tributary of the Fortescue River 4.5 km north of the proposed Gregory Gorge dam site (Plate 5; Fig. 2). Headward erosion has cut a gorge terminating in a waterfall. The gorge contains a series of pools which are probably sources of good water for several months after rain. The rocks along the edge of the gorge were quarried by Aboriginal stone workers and in several places there are heaps of pointed blades, flakes and cores all made of lithic sandstone or sub-greywacke. Thin-section examination of this stone shows that it is firmly indurated and fine-bedded, consisting generally of fine-grained (0.05 to 0.1 mm), highly angular particles of quartz and feldspar (mainly plagioclase and commonly turbid with alteration) together with ill-defined, altered cherty lithic fragments, minor muscovite, chlorite and accessory zircon. The sample examined was marked by small (0.05 mm) porphyroblasts of pyrite (1-2%) and by scattered rhombs of poikiloblastic dolomite. The rock is not significantly metamorphosed; its 'flinty' character is due to the marked bonding between the

cherty material (some of which might be cement) and the more clearly defined clastic fragments.

Aspects of the stone quarrying and tool manufacture carried out at 'Driller's Hole' are discussed below. There are also several engraved rock surfaces at the site.

STONE ARTIFACT ASSEMBLAGES

(C.E.D.)

The flake and blade tool component of the assemblages collected at the Newall site (12) and Crossing Pool (15, 16) is consistent with, though typologically more diverse than the Newall collection of stone tools, and it is clear that Newall was very selective in his sampling. Therefore the following description, while remaining supplementary to Glover's study of the Newall collection (Glover 1967), provides a broader picture of the Millstream stone artifact assemblages than can be determined from the earlier material.

Technology

Silicified shale was the principal stone used for tool manufacture at the occupation sites and quarry-factories on the Fortescue River and Millstream. Most of the dominant flaked tool forms, that is, backed microliths, adze flakes or small scrapers and notched or denticulated flakes, are made of this stone. The other stones used include a secondary silica rock which outcrops in the eroded calcretes exposed in the Fortescue valley surface; chalcedony, one source of which is at Pump Plain Bore (25); and lithic sandstone (sub-greywacke) from 'Driller's Hole' (6) or perhaps other, as yet unidentified, quarries.

Thin-section examination of the silicified shale shows that it consists of sparse, minute clastic quartz grains in an extremely fine, foliated, very murky matrix composed of opaline silica, clay, limonite dust and possibly other components. The rock is laminated; some of the laminae are slightly coarse-grained (0.02 mm) consisting of abundant silicified fragments and less abundant angular quartz grains in a matrix similar to the bulk of the rock. Occasional unsilicified areas were noted in hand specimens. For several reasons the silicified shale is not suitable for the manufacture of large tools, particularly large blades or points with lengths in excess of about six cm. The primary sedimentary structures, that is, the sandy beds and compositional differences noted in thin-section, make it difficult to obtain large blocks of the stone which can be used for blade or point production. The stone also

lacks mechanical strength because it is internally fractured due to thermal alternation and dehydration of the opaline silica. Aborigines informed one of us (K.P.) that the surface stone was unsuitable; 'cool' stone useful for flaking could only be obtained by digging down into the eroded bedrock. On the whole blade and flake production at the sites where silicified shale is predominant seems to have been limited rather than enhanced by the physical qualities of this stone.

These assemblages are based primarily on a flake technology though there is an important blade and bladelet element. (We divide blades and bladelets on the basis of size and proportions; cf. Tixier 1963: Fig. 7.) Flakes are mostly irregular with very variable size and proportions. Faceted butts occur and are much less common than plain.

There are several different kinds of flake cores in the Millstream assemblages. Most are simply amorphous or irregular fragments, or sometimes tabular slabs from which flakes have been removed randomly from convenient striking platforms. There are also single platform flake cores made on chunky fragments or thick flakes. Most of these are small with maximum dimensions of three to six cm. We found no typical horsehoof cores (e.g. Mulvaney 1975: Fig. 26) at Millstream. Typical Levallois flake cores and discoidal cores seem to be absent, though both these forms are known in north-western Australia (Dortch 1972; 1977). However, some of the flake cores made on pieces of tabular silicified shale are technologically the same as discoidal cores (Bordes 1961, pp. 72-3), with the difference that their flaking faces are not circular in plan but irregular or rectangular. A chalcedony specimen of one of these is shown in Fig. 5:6. There are also many bipolar or scalar cores (White 1968) in the Millstream assemblages; a thermally-fractured example is shown in Fig. 5:8.

Blade and bladelet production in the riverside occupation sites and quarry-factories is based on two distinct methods.

The first is direct percussion of which there are two variants: in one the cores are unprepared tabular fragments from which a few blades or bladelets have been struck from convenient corners; the other is a formal method by which a crested flaking face is produced deliberately by retouch in order to prepare the core for successive blade removal. Bordes and Crabtree (1968, pp. 3-4) provide the most detailed description of the latter technique. These authors point out that bilateral cresting is not always necessary when working with angular material, as with the informal Millstream blade cores above. Most of the Millstream crested blades have only unilaterally retouched crests; the very few bilaterally

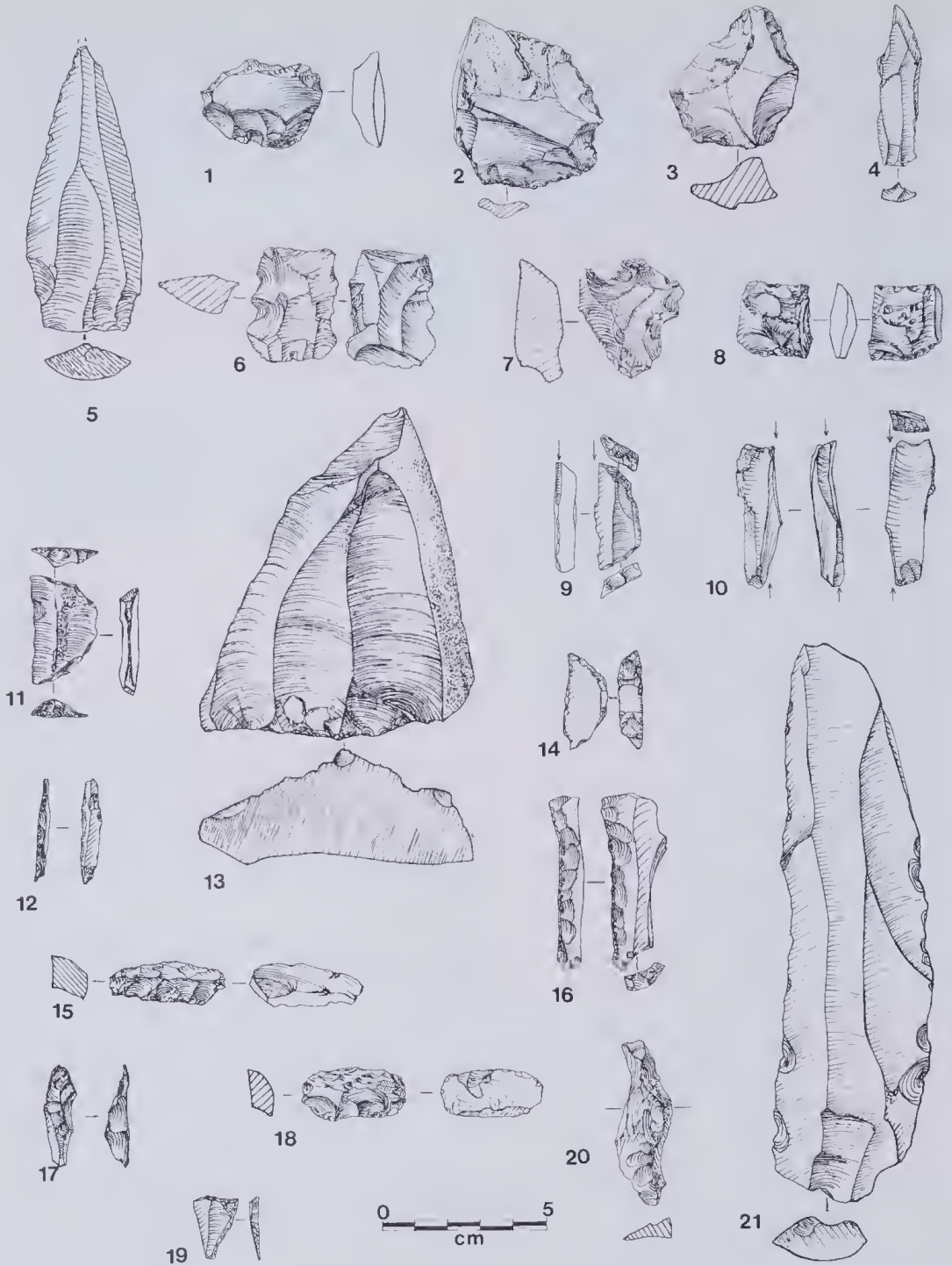


Fig. 5: Flaked stone artifacts from surface sites, Millstream station.

crested blades which have been identified are irregular. A bilaterally crested bladelet and blade are illustrated in Figs 5:17 and 20.

One of the Millstream bladelet cores is shown in Fig. 6:8. The piece is made on a tabular fragment and has a faceted striking platform. Cores such as this were used in the production of bladelets with faceted butts (Fig. 5:4).

The second method of bladelet production is a form of bipolar technique. The cores used are small elongate fragments (Fig. 6:2) which were flaked in the same way as in bipolar flake production (Bordes 1961; White 1968). The core is held on an anvil and several sharp blows are sufficient to produce a number of small bladelets or elongate flakes. The advantage of the technique is that it enables usable blanks to be produced with ease on very small cores. These cores can also be flaked by direct percussion while being held in the hand, in which case the bladelets or flakes are struck from either side of one extremity in much the same way that burins are spalled. Bladelets produced experimentally by this technique are usually irregular and often are relatively thick with quadrilateral sections.

It is likely that variants of blade and flake production other than those outlined here were used in the silicified shale quarry-factories on Millstream station. For instance, there are a number of specimens which are technologically and typologically the same as burins on straight or concave truncation (Fig. 5:10). In some cases several burin spalls have been struck from the truncated ends of these pieces. Were these tools used as gravers or chisels (i.e. *burins*) as is probably the case with their Eurasian and African analogues? Or are the Millstream specimens specialised bladelet cores?

The lithic sandstone quarry at 'Driller's Hole' is the only leilira point and blade factory known in the Millstream area, though others have been recorded in the Chichester Range 120 km east (Dortch 1972). Here we collected a number of large blade cores of pyramidal form as well as others (Fig. 5:13) which are intermediate in form between prismatic blade cores and Levallois point cores. Typical Levallois point cores appear to be absent. Very large numbers of prismatic blades (Fig. 5:21) are strewn over the surface of the 'Driller's Hole' quarry-factory. There are also pieces closely resembling Levallois points (Fig. 5:5; cf. Bordes 1961, Plates 6:3, 4, 8:5; Dortch 1972, Figs 4:b, c, d, f). It appears that pointed blades resembling elongated Levallois points were manufactured in the Fortescue valley by a para-Levallois technique, that is, successive blank production on pyramidal cores. It is also possible that typical Levallois point cores were further flaked following the removal of one or two Levallois points, a technique identified in the Ord valley, Kimberley (Dortch 1977).



Fig. 6: Flaked stone artifacts from surface sites, Millstream station.

Flaked Stone Tools

For convenience we have followed the order of Glover's tool analysis in the description below.

Backed microliths: Very few backed microliths (50 specimens) were found in our sampling of the Millstream sites; almost all came from the Newall site (12) and Crossing Pool (15, 16). Glover (1967, p. 419) divides the microliths of the Newall collection into two groups according to their length:width ratios. The first group (A) are geometric microliths in the strictest sense, that is, those having distinctive 'geometric' forms. The dominant forms of these in the assemblages we collected are segments (Figs. 5:11, 6:5), trapezes (Fig. 6:10), or triangles (Fig. 5:19) according to the profiles formed by their abruptly retouched backs and unretouched or lightly-trimmed thin edges. Some of the segments are very thick (Figs. 5:14, 6:11) and clearly resemble smaller examples of the elouera (cf. Mulvaney 1975, Fig. 36d) of eastern Australia. Glover's group B consists of backed microliths having length:width ratios greater than 2:1. These consist mainly of asymmetric backed points ('bondi points': McCarthy 1967, p. 40) and rectilinear backed bladelets which may be pointed or not (Fig. 5:12, 6:3); some of the latter have bilateral abrupt retouch, the thinner edge being only partially trimmed. Fig. 6:6 is an irregular asymmetric backed point with a faceted butt.

The dominant forms within each of Glover's groups A and B grade into one another; for example, Fig. 6:7 is intermediate in form between the asymmetric backed points and the rectilinear backed bladelets. There also seems to be a gradation in form between groups A and B. Possibly some of these intermediate forms represent discrete tool types. These include elongate segments (Fig. 6:1) and trapezes (Fig. 5:9) which are each intermediate in form between the typical geometric category (group A) and some forms of rectilinear backed bladelets whose backs are slightly curved or oblique at the extremities (Fig. 6:9).

A notable feature of these assemblages is the number of backed microliths of all kinds which are in part naturally backed. There are also numbers of naturally backed bladelets or small flakes which, though lacking retouch, resemble microliths in size and proportions. The elongate trapeze in Fig. 5:9 has natural backing on the lateral edge parallel to the chord. (Note that the distal oblique extremity of this piece is terminated by a single burin facet.) These assemblages also contain obliquely or transversely truncated pieces (Figs 6:4, 6:12), most of which are somewhat larger than the backed microliths.

Adze flakes and scrapers: In his description of the Newall collection Glover (1967, p. 421) noted that "... no hard and fast distinction can be made between scrapers and adzes". This is certainly as true for the Millstream material as it is for many other Australian assemblages. The statement is not only applicable to the finely retouched, small flake tools thought to have been hafted; but also to large core tools such as pebble choppers, which could have been used as hand-held adzes; and to nuclei-form or core scrapers, including horsehoofs, which may have been used as choppers or hand-held adzes rather than as 'scrapers'. The only tools from Millstream which are indisputably adzes of hafted type are the tula adze slugs (Figs 5:15, 18). These are a numerous and very well characterised group (cf. McCarthy 1967, pp. 27-28; Mulvaney 1975, pp. 233-235). They seem to be confined to the larger occupation and factory sites such as the Newall site and Crossing Pool, a distribution which agrees with adze flakes being maintenance tools in the sense of Binford and Binford (1969).

The flaked tool assemblages from Crossing Pool and the Newall site also contain what we designate as non-tula forms of probable adze flakes (Fig. 5:1), characterised by the undercutting and crushing or blunting of the periphery of the working edge associated with adze use. These may have single or double working edges; most are made on flakes and a few are on small blades. One of the latter is seen in Fig. 5:16. The piece has an invasively flaked working edge whose outer part is heavily crushed and blunted. The proximal end of the piece has been obliquely truncated. Other blades and flakes have invasive or scalar retouch but not all of these appear to have been used as adzes. We have not identified any invasively flaked projectile points in the Millstream area, though a presumably prehistoric specimen is known from Pardoo Station 300 km to the northwest (Fig. 1, Dortch 1977).

The retouched tools identifiable as flake-scrapers include many of generalised form on small flakes (Fig. 5:3); many of these could have been hafted and used as adzes. There are also a few end-scrapers on blades, bladelets and flakes, and very many irregular scrapers on thick flakes.

Other pieces: The scrapers on thick flakes above merge imperceptibly with a numerous group of Millstream artifacts which are perhaps best described as thick notched flakes (Fig. 5:7). The function of these artifacts is unknown; they may be small flake cores or they may have been cutting tools or scrapers.

There are also very many flat, notched or denticulated flakes (Fig. 5:2). Other pieces from the Millstream sites (such as blades, bladelets and

flakes) have edge damage probably resulting from their having been trampled by livestock or disturbed by erosion rather than from retouch (including deliberate notching) or use. In the case of the leilira blades in Figs 5:5, 21 most of the small flake scars on the edges are fresh showing that they were produced long after the blade was manufactured and are probably natural or accidental in origin. In many cases, particularly with very thin pieces such as the bladelet in Fig. 5:4, it is uncertain whether the chipping along the edge is fine retouch, use-wear, natural damage, or a combination of these.

As noted earlier some of the Millstream sites, particularly the Newall site, contain numbers of grindstones and anvil stones. We have not attempted to classify these tools here as most are fragmentary. It should be emphasised, however, that it is the presence of grindstones and anvils, along with flaked stone tools and *débitage* resulting from tool manufacture, which enabled us to identify some assemblages as occupation sites.

ART SITES

(J.C. and W.C.D.)

Two concentrations of rock art (sites 4, 5) occur in Gregory Gorge, one on each side of the gorge on vertical rock surfaces close to river base level. This art has two features which set it apart. Firstly, at each site there are both paintings and engravings, an unusual occurrence in the Pilbara. Secondly, the engravings are stylistically different from the major Pilbara engraving sites, although they have much in common with other river valley sites in the area. Wright states that the art of Gregory Gorge has the highest ratio (86%) of human figures to other motifs of any Pilbara site examined; and that in the areas where the human figures are most prominent “. . . the engravings are mostly of the closely drawn elongated type typical of the Fortescue River sites.” (Wright 1968, p. 49.)

Site 4 is the larger of the two Gregory Gorge concentrations and consists mainly of engravings. Some 150 individual figures were counted although many are linked. Most representations are of human or human-like ‘stick’ figures (Plates 7, 8), the few exceptions being emus. The very faded paintings show greatly enlarged emu footprints and configurations of lines.

At ‘Driller’s Hole’ (6), there are a relatively small number of engravings so patinated as to be almost indiscernible. There are others at *ganya* (1), a site recorded by Wright as *pirina* (Wright 1968, p. 25).



Plate 6: Part of site 4, Gregory Gorge, showing engravings restricted to prominent bed of fine-grained lithic sandstone (scale on left edge of engraved surface is 20 cm long).



Plate 7. Close-up view of engraved stick figure at site 4, Gregory Gorge, showing how percussion has removed darker surface zone of weathered rock (scale length: 20 cm).



Plate 8: Engraved stick figures at site 4, Gregory Gorge (scale length: 5 cm).

Engravings at sites 1, 4, 5 and 6 have style factors in common and utilise similar rock strata. The same style characteristics are repeated many kilometres downstream at *Bilanu*, again on similar rock, suggesting a common origin. The stick figure engravings are generally 20-25 cm in length, the maximum size being controlled by the available space between natural joint and bedding plane fractures (Plates 7, 8). They have been produced by selective removal of the darker surface zone of weathered rock and range from 0-3 mm deep. The technique used appears to have been percussion with a hand-held rock, which must have been sharp to produce the fine detail in many examples.

The surfaces on which engravings have been made in Gregory Gorge are restricted to one particular bed of fine-grained lithic sandstone in a sequence of sandstones, cherts and volcanic rocks (Plate 6). The sequence has been gently folded and the rock band containing the engravings dips 10° eastward but becomes more horizontal to the east. Most of the engravings are on near-vertical surfaces formed by well-developed joint planes normal to the bedding. Joint spacing is about 40 cm and the bed on which the engravings were



Plate 9: Remains of painting at site 5, Gregory Gorge. The painting is visible only because the pigment, which is almost completely lost, has altered the weathering products on the surface and left an image of lighter coloured rock (scale length: 20 cm).

made 50-70 cm thick. The rock is firmly indurated with a very finely crystalline to cherty matrix. It is more resistant to weathering than the overlying and underlying shales, which in weathering permit large joint blocks to become loose and fall out. The cherty nature of the rock makes it very brittle; there is evidence of impact flaking on exposed edges which may be of human origin or due to impact by flood borne material. The rock is being weathered very slowly by chemical processes. It contains small pyrite cubes which oxidise in weathering to produce the dark surface colour. It also contains dolomite, which is leached by water to give the surface texture, and feldspars which break down to form clays, giving the softer surface zone which was used for engraving. The impermeable nature and high silica content prevent weathering extending more than about two mm from the surface.

It is probable that other Fortescue sites which have not been examined so closely utilise a similar band of rock. To some extent the nature of the rock, imposing as it does a size restriction on the engravings (yet providing a flat surface which can be pecked relatively clearly) is a key factor in the similar appearance of engravings throughout the valley.

The paintings at sites 4 and 5 are very faded and show red and white pigments only. They are on similar surfaces to the engravings but are consistently about two m higher up, suggesting that lower paintings have been washed away by floodwater. Some paintings are only visible because the pigment (now almost completely lost) has altered the weathering products on the surface and left an image of lighter coloured rock (Plate 9). Apart from the probable emu footprints the paintings' motifs are not obvious, even to local Aborigines; and most are so faded that it is not possible to say whether they are complete. A few other paintings have been recorded in the Wittenoom area (Fig. 1) and on Hooley station in the Chichester Range, but to date none have been found in abundance anywhere in the Pilbara region.

Art sites on Millstream station appear to have links with occupation sites 5 and 6; and the engravings at Ganya (site 1) have ritual significance, as noted in the next section. Nevertheless, even though Aboriginal informants have said that the art was made by the *marga* (in this case the 'Two Men') as they travelled down the river, relatively little mythological importance seems to be attached to it, with the significant exception of some engraved ceremonial decorations at a few unspecified art sites. Our own findings are largely in keeping with Wright's statement that ". . . the guides casually indicated where the engravings were, then . . . spent the whole time searching for certain eroded marks which they had been told had a ritual significance . . . I wondered whether their apparent lack of interest in the

engravings indicated that these pictures had no significance in the ceremonies associated with this place." (Wright 1968, p. 25.)

MYTHOLOGICAL AND RITUAL SITES

(K.P.*)

There are two important mythological sequences. The first and more substantial is of the general nature of the 'Two Man' myth (Berndt, R.M. & C.H., 1964, p. 205). It follows the Two Men in their travels down the river in the Dreamtime while establishing the belief system that was and still is followed by the Aborigines in the region. The second is an aetiological myth about one pool in the river and apparently not connected with the first story line.

The Two Man Myth

The Two Men were brothers called *Duwaramada* and *Balindjamada* and they had a short-tailed dog called *Dyudurli*. They are described as *marga* men, ancestors from the Dreamtime who were very tall and thin but human in other respects (Palmer, 1975, p. 155). They appear to have come out of the ground.²

*That's when they first started. And they came up to a proper, like a proper human being, sort of coming up.*³

The myth is preoccupied with the establishment of the circumcision procedure and associated ritual.

Site 27: *Irangu dalu*

Duwaramada's and Balindjamada's first activity was to establish the material resource for the circumcision cutting stone. This was known as the

* Part of the material in the following section is being published in a separate paper (Palmer, in press).

2. The *Bugadjimbiri* in the *Nyamil* line came out of the ground at De Grey. Informant, Yandearra, September 1974.
3. Informant: a *Gurima* man with some *Bandjima* association, though he also speaks *Mardudyunira*. He was born near Pannawonica, and has spent his life working on station properties in the area.

irangu, a term for a stone knife, or esoterically as the *gandi*. The reef of fine-grained rock that the Two Men left behind is referred to as *dalu*⁴, a term used generally of sites associated with the myth. Stone from the site is still prized for its qualities as a *djimari*⁵ though *irangu dalu* (27) could not be visited by women because of its sacred associations. The choice of the correct stone depended on its colour:

*You go by the colours, it mustn't be red or things, you know red, no good red colour . . . red's like a danger, like you know for blood . . . Make the boy, you know when you do the boy in it'll bleed, you know too much.*⁶

The correct stone was brown or white and had to be extracted from below the surface:

*But this one mustn't be from the surface, from outside, you've got to dig 'em up a bit, you know from the sunshine . . . a little bit underneath from the ground, a few inches deep.*⁷

The site was so prized traditionally that men from other areas would visit the region in order to trade artifacts for the *irangu*.⁸

Site 28: *Mural*

Mural dalu (28), another material resource site, is a red ochre mine in the banks of the river a few km downstream from site 27. *Mural* according to the informant meant 'blood' and the ochre was used to decorate the Two Men prior to their initiation. The ochre is first ground and then mixed with fat:

4. *Dalu* generally means a pet, but is also used for a place associated with the perpetuation of a particular plant, animal, fish or disease, or more generally a resource centre known for its Dreamtime affinities. Further east the term *nyuga* is used often with specific reference to the conception totem, while *djabija* is used for a perpetuation centre (cf. Tonkinson 1974, p. 75).
5. The prepared circumcision knife.
6. Informant, footnote 3, May 1975.
7. Informant, footnote 3. Informants from Onslow at a similar site on Nyang station (April 1974) and a *Nyamil* informant at a site at Yarrie station (April 1975) independently made the same statement.
8. Informant, May 1975: a man of *Indjibundi* and *Bandjima* descent born at Deepdale station. He has worked on stations in the area and became a dogger (dingo hunter) in 1953, and has always taken a keen interest in traditional matters, learning much from older people who are now dead. *Bandjima* informants preferred to use the term *guran* to *irangu*.

*Dripping nowadays, years ago it was the kangaroo fat, that's what they used . . . and you put it in this one and rub it up like that, he's very soft and nice . . . no colour only just that red, he look pretty, dress him up like that, smell good too, somehow.*⁹

Site 1: *Ganya*

Some km further down the river there is, in the flat stratum of the river bed, a circular dome-shaped rock formation several metres across. At its periphery is a smooth shallow groove, "like a wheel rut", said to have been caused by the dancing feet during the first initiation ceremonies for Duwaramada and Balindjamada. This is *ganya* (1), the major site of the complex and of fundamental importance to the established circumcision rituals of the region.

The ceremony centres on the dancing circle. For some weeks prior to the initiation dancing takes place clockwise round the circle and a variety of songs are sung. The dance, circle and songs are known collectively as the *bundud* and roles depend upon relationships to the initiates, there being two major groups which form the basis of local Aboriginal social organisation in general. The contemporary blood relationships, including brother and sister and the grandparent generation, are known as the *djindjanu* — the workers. The girls from this group perform the dancing and as a whole they are subservient to the parental kinship sections, which include aunts and uncles, known as the *gangu* mob — the 'bosses'. Age also confirms status amongst the *gangu* themselves, while the closer blood relationships take a more prominent role in the proceedings. During the *bundud* the *gangu* may sit inside the circle and beat time with a stick on a *yandi*¹⁰. Meanwhile the initiates, known as the *bagali* or more exactly the *marlu-lu*, have spent time away in the bush cared for by the *mumiya*, a male clown with special privileges which include his being allowed to dance — an otherwise female prerogative. The *marlu-lu* is strictly a prisoner, since he will have been 'grabbed' by the *gangu* men and forcibly marched away: the manner in which he is then treated will probably depend on his record for good behaviour previously, since misdemeanours are dealt with harshly at this time. The *bundud* is 'open' until the last night or nights when a warning song tells the women and children to leave. The remaining men then sing the 'big' (i.e.

9. Informant, footnote 8.

10. A *yandi* is an open wooden dish or vessel, known elsewhere as a *coolaman* and as a *pitchi* dish. The name also applies to the action of winnowing seed from husks in the dish, and in contact times separating tin concentrates from river sand by hand.

sacred) songs for the rest of the night until a little before sunrise when they go to the boys and sing secret/sacred circumcision songs known as *muwra* prior to the operation.

They then return to the *bundud* place with the initiates, encircling them 'like a cyclone' and singing. The rest of the group form two converging lines down which the men proceed, the whole movement being known as the *bidara*. A bough shed is prepared nearby for the initiates who must rest in its shade, and the *gangu* sit nearest to them. It is traditional for the relations to cry for the boys as they return in the *bidara*. The ritual food, known as the *djida*¹¹, is also displayed at the *bidara*, and the *gangu* have proprietary rights over its distribution.

Ganya, in the Fortescue, was where the *bidara* ritual was first established and its validity is verified by the rocks that bear the marks of the *bundud*. Informants point to marks made in the centre of the circle by naked buttocks where the *gangu* sat, and to footprints in the rock. It is felt that during the creative period the rock was soft and the peripheral groove shows where the *djindjanu* danced. Two hollows adjacent to the site are marked as being the bough shed for the two boys. One set of footprints leads away from the *bundud*, and are said to be the marks left by a man who took a girl into the bush for illicit sexual activity; but the connection with the *bundud* was not explained.¹² Nearby is a *dalū* for the moon (*wilara*). This is associated with the kangaroo (*marlu*) and consists of a small circular patch of white quartz in the horizontal rock. While the *dalū* is not specifically a part of the *bundud* mythology, informants claim that it was placed there by the Two Men as they "laid down the law" in the river.¹³ The moon was made to shine brightly in the Dreamtime by the *marlu*, who urinated on it to clean off the grease and dirt. The *marlu* was thus assured of safety at night when he could see his enemies more clearly. The practice was repeated traditionally to ensure a bright moon, ironically for kangaroo hunting, though water from a *yandi* was used in preference to urine.¹⁴ There was also an associated sun *dalū*, but little or no information was available about its function.

11. *Tjiri*, type of spinifex (Pitj). *Tjiru*, long strong spinifex, also *tjirangku*, boy of 12 years old (Ten Raa & Woenne 1973).
12. Informant, footnote 3.
13. There is a possible connection between the term for the prisoner *marlu-lu* and the word for kangaroo, *marlu* (Berndt & Berndt 1964, p. 206 ff).
14. Informants, April 1974 — *Ngarluma* man, approximately 80 years old, and was born on Croyden station and has worked in the area all his life. Until his recent blindness he was regarded as a leader of the local people, and is still highly respected. See also footnotes 3, 8.

Other Sites

The final sites of the complex are located some distance downstream at a place known as *bilanu*. Here two hollows in the hillside are said to have been the resting place of the Two Men after they left *ganya* and travelled down the river. They fed on catfish, the fat of which is metamorphosed in the form of greyish rocks adjacent to the hollows.¹⁵

Numbers of engraving sites (Fig. 2) are found along the banks of the Fortescue River. Many have representations of thin stick-like human figures, said to be *marga*,¹⁶ drawn during this creative period by the *marga* themselves — or sometimes specifically by the Two Men (who were *marga*) who “laid all the law for us”.¹⁷ Their significance to Aborigines rests often not in what they represent figuratively but in that they are a part of the great creative process and must not be interfered with since they are representative of that spirit time. In some instances ceremonial decorations have been recognised by informants¹⁸ who emphasise these as another aspect of the mythology and rituals ordained in the Dreamtime. To an extent the myths and rituals depended on the engraved decorations for their authenticity and inviolability. In this sense the rock circle of *ganya* can be seen to occupy a similar place in the mythology to the engravings.

Several km upstream from *ganya* is the place where the Two Men disseminated the circumcision ritual and belief amongst the tribes of a wide area. One informant¹⁹ mentions 13 initiates who first came to the place to be “put through the law”. Each was circumcised in turn. Some were strong enough to go through the operation without crying or shedding too much blood; others shouted with pain or were in danger of bleeding to death. Those who fell short were deemed unworthy to “carry the law” and were given just the songs “for the fun of it” and could only cut their arms, not their foreskins.

Site 29: *Djida*

The place known as Kumana Hill (29) now stands at the side of the river as the metamorphosed *djida*, or ritual food collected at the time. Today,

15. Informant, footnote 3, April 1974.

16. The *marga* is a general term for an ancestral figure, used widely throughout this area of Western Australia.

17. Informants, March 1974 — *Bandjima* man, now living at Onslow as leader and spokesman for the Aboriginal community. He is a respected law man, with considerable interest in its conservation. *Indjibundi* woman, born at Millstream.

18. Informants, April 1974 — see footnotes 3 and 16, *Bandjima* man.

19. Informant, footnote 3, April 1974.

this is collected for the initiation ceremony and laid out adjacent to the dancing area. Only those in charge of the proceedings (the 'bosses') are allowed to touch it, though a general distribution at the end of the ritual ensures that all get a share. Today the *djida* consists of many bags of flour and tins of jam and meat. Traditionally it was made up of plant seed, from which the damper was prepared, and fresh meat. The size of the amassed food indicated the prestige of the occasion and the Dreamtime contribution is accordingly massive, being now metamorphosed and appearing as a huge block of rock some 22 m in height at the side of the river. Some of the boulders at the foot of the hill are formed of conglomerate; the small, smooth pebbles are said to be plant seed. Several different sorts of seed are represented there:

*It was a mix up of food too, it used to be . . . yambula [that] is a run of weeds growing in the flat . . . another one, gadbi, that's another tucker name, weed, a little seed. Bunina grows out of one of them trees, and he's very oily, he's a black seed, and the guwnura is a grass grow like the buffalo grass . . . very rich stuff guwnura. And bila, he's a very rich food, grows on the gravel country.*²⁰

The meat was made up from kangaroos, goannas, emus, and turkeys when they could be obtained. The transformation to stone was not explained by a particular event, though one informant felt that "something went wrong". His second version was more typical:

*I told 'em [the old people] "Why turn into stone?" They say "Well, that's the law of the country, years ago". And that's why they put the evidence there, and you've just got to believe it like that.*²¹

Site 26: Nangunangga

There remains one myth, not directly connected with the *ganya* complex of sites, that explains the formation of Deep Reach Pool (26), a large permanent pool a few km above Millstream homestead. The story in outline runs as follows:

Two boys were out in the bush, waiting their time to be initiated. A mamiya was looking after them. He was, however, a little negligent and on one occasion took rather longer than he should fetching the boys their food. The boys grew impatient and seeing a bird, stoned it, then plucked, cleaned, cooked and ate it. Nearby was a water snake, barimidi.

20. Informant, footnote 8, May 1975.

21. Above informant, footnote 8, May 1975.

He smelt the food cooking and got very excited. He caused a cock-eyed bob to start and it whistled all sorts of ducks and birds towards the boys, who were naturally very pleased, and eagerly went about trying to collect the birds in the confusion. Meanwhile the barimidi drew closer to the boys. The mamiya saw what was happening and tried to warn everybody, but alas it was too late. The barimidi turned around and made a great suction through his anus and drew them all inside of him. And it was because of this that there is now a huge pool at nangunangga (Deep Reach).²²

Informants from Strelley station told Aborigines at Yandearra²³ that Millstream was the centre for a song line dominated by a water snake and associated with a rain-making ritual. It was believed that if the snake was upset there would be a huge flood. The information was confirmed by *Indjibundi* people from Roebourne who talked of a snake and a huge flood which would result from any disturbance to the river. There is no indication at present that the rain-making ritual and associated snake are connected with the *barimidi* story, but the similarities are too obvious to ignore.

CONCLUSION

In this paper we have recorded data relating to several of the diverse Aboriginal activities which have taken place in the area now occupied by Millstream pastoral station. The study, detailed as it is in some respects, does not purport to be an integrated analysis, neither in the terms of cultural ecology nor as a developmental impact statement. Further assessment of traditional Aboriginal subsistence and land-use in this area is needed; ethno-botanical enquiries (cf. Scott 1972) in particular would yield important information. A more detailed study of the archaeological sites and artifact assemblages collected from them would undoubtedly be profitable, though we maintain our view that erosion and other disturbances severely limit the value of many sites.

Despite the present scarcity of ecologically relevant ethnographic and archaeological data it seems reasonable to assume that the Millstream area,

22. Above informant, footnote 8, May 1974.

23. Informants, Yandearra, August 1975, after a conversation with a *Nyungamada* man from Strelley station.

with its abundant water and food resources, would have supported relatively large numbers of people for longer periods than elsewhere along the Fortescue. Several verbal reports indicate that up to 200 Aborigines camped at or near Millstream in the early pastoral years. Wright (1968, p. 25) noted: "My Aboriginal informants told me that in the early days people came from surrounding groups to this place in *Indjibundi* territory for inter-tribal meetings 'to make the law'." This corresponds with a report from a pastoral property near the mouth of the Fortescue that in the 'early days' Aborigines used to walk up the Fortescue river to Millstream station for their 'holidays'. Among its chief commodities was stone sought for ritual or tool-making purposes, and wattle for spears; it was also generally known to be a good place to catch fish and gather edible roots. Tindale (1974, pp. 22, 57, 58, 59, 241-42) has a number of significant comments on *Indjibundi* cultural ecology.

Ethnographic data relating to mythological and ritual sites in this part of the Fortescue valley certainly support the archaeological evidence showing that it was an important area. Mythological sites identified appear to bear no particular relationship to occupation sites although quarry sites were known as sources of ritual stone and ochre. Other mythological sites relate to topographical features: pools, outcrops and unusual configurations of rocks. It is not surprising that a prominent feature like Deep Reach Pool (*Nangun-angga*: site 26) has associated aetiological myths; and it is because of such sites that the area is still very important to the Aborigines. The *Ganya* site (1) is also well-known to the Aboriginal people in the region. Both sites represent a source of important Pilbara belief and ritual and certain associated ceremonies have spread widely, as described by von Brandenstein and Thomas in the following.

The pundut ritual originated on the Fortescue River near Gregory Gorge. Since then it has expanded and contracted to and fro, each time altering and 'modernizing' its rules . . . 'pundut' refers to the hitting of covered-up bark pieces (now car tyres) and the thuds effected by this method. A vital part of the pundut ritual is the animal fables in song form . . . (Brandenstein & Thomas, 1974, p. 90).

The Aboriginal people who still retain detailed knowledge of the myths surrounding the Millstream area desire that the valley be preserved. We hope that this is a possibility, not only for them, but for the many other Australians, Aboriginal or not, for whom Millstream has a special significance.

ACKNOWLEDGEMENT

We wish to thank those staff of the Western Australian Museum who co-operated in the preparation and publication of this account.

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